

Thomas (J.G.)

THE
MOST EFFECTUAL METHOD
FOR
CONTROLLING THE HIGH TEMPERATURE
OCCURRING
AFTER OVARIOTOMY.

BY
T. GAILLARD THOMAS, M.D.

[REPRINTED FROM THE NEW YORK MEDICAL JOURNAL, AUGUST, 1878.]



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THE establishment upon a firm and enduring basis of clinical thermometry, as an adjuvant to the practice of medicine and surgery, constitutes one of the most important advances which has marked the nineteenth century, prolific as it has been in progress. No longer like his forefathers, groping in the dark and dealing with surmises and conjectures, the practitioner of to-day finds the former, both in diagnosis and prognosis, replaced by certainty and the latter by scientific deduction. By the aid of this accurate method he watches his patient's progress from day to day, nay, even from hour to hour, with the calm confidence of one who has a reliable knowledge of the present and a certainty that he will be forewarned as to the future.

But it is not only in reference to diagnosis and prognosis that thermometry aids us at the bedside. It having been observed that prolonged high temperature kills; that, the animal heat being kept for days at 106° , the patient almost invariably succumbs, the knowledge of this fact naturally suggested the adoption of means which, even although they did not cure the

existing disorder, lowered the high rate of temperature, and barred at least this avenue to the approach of death.

Although, scattered here and there through ancient medical literature, may be found evidences of desultory efforts at the accomplishment of this result, by the adoption of what I shall to-night maintain as the simplest and most effectual means, refrigeration of the surface by water several degrees colder than the body, it was not until the close of the last century that this method, guided by clinical thermometry, was adopted and fully introduced to the world. In 1787 James Currie, of England, wrote a work urging the adoption of clinical thermometry as the only certain method of ascertaining the degree of animal heat, and the affusion of cold water as the most reliable means of reducing this when much above the normal standard.

I would not be understood as accrediting Currie with the origination of either clinical thermometry or refrigeration of the surface for the depreciation of the temperature. As to the former, as early as the first half of the seventeenth century (1600 to 1636), Sanctorius, of Padua, applied a thermometer of his own invention to this purpose, and in the use of this instrument he was later followed by Boerhaave and Van Swieten. None of these pioneers, however, applied the use of the instrument to the practice of medicine. It appears to have given its rare deductions rather to the advancement of physiology than to that of therapeutics. For De Haen, of Austria, was reserved the glory of the adaptation to practical medicine of one of the greatest contributions which has ever marked a century in the existence of the healing art. After his death his valuable discovery was forgotten, and although something was done in reference to the matter by Martin, Haller, John Hunter, Lavoisier, and Crawford, it was not till the time and labors of James Currie that it was, as has been the case with so many others in medicine, remade and placed upon a scientific basis. Currie's book dealing with these two subjects was entitled, "Medical Reports on the Effect of Water, cold and warm, as a Remedy in Fever and other Diseases." The use of the thermometer dominates the work entirely, and was evidently his chief guide in diagnosis, prognosis, and treatment, the lat-

ter consisting chiefly of the affusion of cold water over the patient seated in a tub. The water was poured over the head and chest, from a height of two or three feet, and at a temperature of 40° to 50°, the affusion being ordinarily repeated two or three times a day as the necessity was indicated by the thermometer.

I have said that evidences of desultory efforts at this method of lowering the temperature will be found in the works of old writers. I will quote but one, which appears on the ninetieth page of Collier's translation of Celsus: "But when an ardent fever is consuming the patient, no medicinal potions are to be given, but he is to be cooled in the accessions with oil and water, mingled by the hand until they turn white: he should not be half suffocated with bed-clothes, but covered very lightly. Also vine-leaves steeped in cold water may be applied upon the stomach. He is not to be harassed with excessive thirst."

Currie declares that he got the suggestion of his practice from Dr. Wright, who, in 1786, published reports of cases treated by cold affusion in 1777. He likewise gives, as a reason for his willingness to try the method, the fact that his "respectable colleague, Dr. Brandreth, had employed cold water externally in some recent cases of fever with happy result."

Although it would appear to one reading Currie's simple, unpretending work to-day, with its faithful thermometric record of every case, and its evidently truthful relation of the wonderfully beneficial effects of cold applied to the surface, that it must have carried conviction to all minds, this was not the case. It appears to have produced no profound effect, and the doctrines which it taught were soon forgotten. For the modern revival of cold affusion for the control of hyperpyrexia we are indebted to Brand, Jürgensen, Bartels, Liebermeister, and others, who have especially applied it to the treatment of typhoid fever—while for the popularization of clinical thermometry we have to acknowledge the efforts of Andral, Demarquay, Zimmermann, Bärensprung, Traubé, Wunderlich, Ringer, and others, the enumeration of whose names would make a list too long for introduction here.

Clinical thermometry now stands firmly placed upon an

enduring base, which will probably sustain it as long as the existing civilization lasts. But how is it with the other of the two suggestions, the great value of which Currie strove to demonstrate nearly a century ago? It has even now not achieved for itself success. Even in typhoid fever, the affection for which its modern champions especially urge its adoption, it is by no means generally employed, and we find ourselves to-day in the singular attitude of men who carefully note the rise of temperature which they are almost powerless to control after its abnormal elevation has been ascertained. I have quoted the methods adopted for this purpose by Celsus, who lived in the first century. How much are the ordinary ones at our disposal to-day in advance of those which he applied eighteen hundred and seventy-eight years ago? Enthusiastic therapeutists will reply that, in large doses of quinine and salicylic acid and its salts, we have powerful agents which he lacked. My experience with these drugs as to certainty and efficiency is not so gratifying as theirs; not such as to make me feel a great degree of sympathy for old Celsus, who was forced to get on without them.

That in cold affusion we possess a certain, and, when carefully managed, a safe method of lowering abnormally high temperature, no one can doubt who has given the method a fair, impartial, and intelligent trial. Then why is general refrigeration of the trunk so little adopted in diseases marked by great increase of animal heat to-day? The reason is to be found in the difficulties attending the application of the method. To lift a heavy adult out of bed every three or four hours into a bath tub is exhausting and harassing to the patient and fatiguing to the attendants, while in the case of a female the exposure involved renders her averse to it. Sponging the body with cooling liquids is so uncertain and imperfect that it scarcely repays the practice of it. And the "cold pack" of the hydropathist not only tires the patient very much, but soon loses its influence for good by abstracting animal heat from the body and becoming in reality a warm fomentation. Had it been at all times practicable to apply cold water to the entire trunk so as to control elevation of temperature from the inception of diseases marked by it, I have no

doubt that long ere this the practice would have become general; and I have as little doubt that many lives which have now been lost would have been saved by it.

Here it may be very appropriately asked: "How does the mere lowering of an elevated temperature save a patient's life, while the disorder which created the pyrexia is not cured, but still advances in its career?" Every fatal disease destroys life through the instrumentality of one or more pathological processes, which it develops during its progress. Let me illustrate this statement by a reference to typhoid fever. This affection may destroy life through the instrumentality of intestinal perforation, of haemorrhage, of some complication in other organs, the brain or the lungs for example, of exhausting diarrhoea, of syncope, etc., but by far the greatest number of deaths due to this affection are in all probability effected through the agency of prolonged high temperature. Day after day, week after week, month after month even, in rare cases, the exaggerated elevation of the animal heat exerts a depreciating influence upon the blood, impairs nutrition and effects changes in the structure of the heart, the brain, and other organs, which in time result in complete cardiac or cerebral atony, in venous thrombosis, in pulmonary oedema, in acute yellow atrophy of the liver, with cholæmia, or some other secondary affection, to which the patient succumbs. "If we could guard our patients against the deleterious influences of animal heat," says Liebermeister, "typhoid fever would no more belong among the specially dangerous diseases." Extravagant although the statement may appear, I would from my experience fully indorse it.

An excessive degree of hyperpyrexia may destroy life in a very short time. Let me illustrate this statement by a reference to sunstroke. In this curious, and frequently fatal affection, the pathology of which is not yet understood, the temperature rises to 107° , 108° , and 110° . It has been so long accepted that the pathology of this condition is violent cerebral congestion due to the direct influence of the sun's rays, that with most the matter is regarded as settled; but modern pathologists¹ are beginning to take a very different view of the

¹ Ziemssen's "Cyclopædia," vol. xii., p. 439.

subject, and to regard as the great factor, in the production of the grave symptoms attending the affection, the intensely exalted animal heat which is one of its symptoms. Under the baneful influence of this the blood rapidly becomes acid, rich in urea and white corpuscles, and has little tendency to coagulation. Lactic acid probably develops in it, destroying its alkaline reaction. The heart's power is greatly diminished, and local congestion results; and according to Köster alterations occur in the superior sympathetic ganglia, and in the vagi. Now, it is of course admitted that the high temperature which plays so active a part for evil in this affection is not the essential disease, but its continuance is of primary moment, because it often renders fatal an attack which might not otherwise have proved so. And in support of this view appears the clinical fact that depressing the high temperature by general refrigeration very carefully applied constitutes a most valuable method of treatment.

All that has been thus far said of the value of thermometry at the bedside applies with especial force to its use during the two or three weeks following the operation of ovariotomy. To him who relies upon it not unreasonably, but intelligently and cautiously, it is a guide of inestimable importance. It is true that there are accidents which may occur at the moment of operation, such as rupture of the adherent intestine, haemorrhage, sudden exhaustion of the patient's strength, and others which may bring about an early fatal issue; and after operation, collapse, heart clot, secondary haemorrhage, tetanus, and others may develop with the same result. But beyond question the two greatest and most frequently destructive of all the sequelæ of this capital operation are peritonitis and septicæmia, both of which announce their existence by rapid rise of temperature. The first of these is exceedingly apt, when it does supervene, to demonstrate its existence before the expiration of the first forty-eight hours, though it may occur at a later period as a disease secondary to decomposition of fluids shut up in the peritoneal cavity, or even to septicæmia itself. The second, consisting in an absorption by the lymphatics of septic fluids which are, through the instrumentality of the thoracic duct, poured into the general circula-

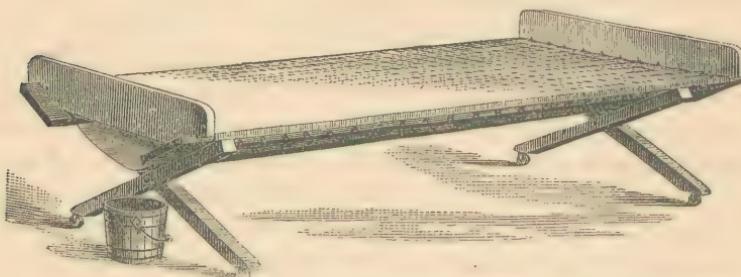
tion, generally develops between the fourth and fourteenth days, though it may occur both earlier and later.

Both these affections produce death in various ways. One of the methods by which a fatal issue is brought about is the production and prolongation of a very high temperature, which soon disorganizes the blood and produces tissue changes in the heart and nerve centres. If from their very inception the temperature could be kept under 100°, and the pulse below 110 to the minute, it is highly probable that many cases would recover which are now lost. That all would do so; no one acquainted with the facts would for a moment hope; for some of the most dangerous cases of both disorders are, as a rare exception to a very general rule, accompanied by a low thermometric range throughout.

As a means of diagnosis, an aid to scientific prognosis, and a reliable guide to treatment in peritonitis and septicæmia following ovariotomy, the thermometer is an invaluable resource; and the object of this paper is to bring before the notice of this society the advisability of controlling the temperature and the pulse at the inception of these affections, while the blood and nerve-centres are still undepreciated in their forces and functions.

The importance of doing this has been recognized by ovariotomists, and partial results have been obtained by the use of quinine in large doses, the administration of salicylic acid, alone or in combination with soda, and the application to the head of the ice-bag of Wells. Struck by the very apparent inefficiency of these means, I have for some time been endeavoring to adopt some plan by which refrigeration of the trunk could be effected without the necessity of exhausting my patient by removal from the bed; and the "cold pack," sponging, and the apposition of wet cloths were, in turn, tried. The use of the cold bath I likewise considered, but it was at once abandoned; for the removal of a patient recently exposed to laparotomy from her bed to the tub was attended by risks which evidently must be much greater than those attending the same process in an ordinary case. The difficulties presenting themselves had well-nigh caused me to forego all hope of employing this means of combating hyperpyrexia, when Dr.

G. W. Kibbee brought to my notice an ingenious device of his for accomplishing the desired result. He places the patient upon what he calls his "fever-cot," which I here exhibit and describe in the words in which he advertises his invention.



"The bed on which the patient lies consists of a strong, elastic, cotton netting, manufactured for the purpose, through which water readily passes to the bottom below, which is of rubber cloth, so adjusted as to convey it to a vessel at the foot. When not in use it can be closely folded so as to occupy but little space."

Upon this cot a folded blanket is laid so as to protect the patient's body from cutting by the cords of the netting, and at one end is placed a pillow covered with India-rubber cloth, and a folded sheet is laid across the middle of the cot about two-thirds of its extent. Upon this the patient is now laid, her clothing is lifted up to the arm-pits and the body enveloped by the folded sheet, which extends from the axillæ to a little below the trochanters. The legs are covered by flannel drawers and the feet by warm woolen stockings, and against the soles of the latter bottles of warm water are placed. Two blankets are then placed over her, and the application of water is made. Turning the blankets down below the pelvis, the physician now takes a large pitcher of water at from 75° to 80° and pours it gently over the sheet. This it saturates, and then, percolating the network, it is caught by the India-rubber apron beneath, and, running down the gutter formed by this, is received in a tub placed at its extremity for that purpose. Water at higher or lower degrees of heat than this may be used. As a rule, it is better to begin with a high temperature, 85° or even 90° , and gradually diminish it.

The patient now lies in a thoroughly soaked sheet with warm bottles to her feet, and is covered up carefully with dry

blankets. Neither the portion of the thorax above the shoulders nor the inferior extremities are wet at all. The water is applied only to the trunk. The first effect of the affusion is often to elevate the temperature, a fact noticed by Currie himself; but the next affusion, practised at the end of an hour, pretty surely brings it down. It is better to pour water at a moderate degree of coldness over the surface for ten or fifteen minutes than to pour a colder fluid for a shorter time. The water slowly poured robs the body of heat more surely than when used in the other way. The water collected in the tub at the foot of the bed, having passed over the body, is usually 8° or 10° warmer than it was when poured from the pitcher. On one occasion Dr. Van Vorst, my assistant, tells me that it had gained 12° .

At the end of every hour the result of the affusion is tested by the thermometer; and, if the temperature has not fallen, another affusion is practised, and this is kept up until the temperature comes down to 100° or even less.

It must be appreciated that the patient lies constantly in a cold wet sheet; but this never becomes a fomentation, for the reason that, as soon as it abstracts from the body sufficient heat to do so, it is again wet with cold water and goes on still with its work of heat abstraction. I have kept patients upon this cot enveloped in the wet sheet for two and three weeks without discomfort to them and with the most marked control over the degree of animal heat. Ordinarily, after the temperature has come down to 99° or 100° , four or five hours will pass before affusion again becomes necessary.

This device of Dr. Kibbee is so simple that one wonders that any perplexity attended his accomplishing all that it does before it was shown to him, and at once the thought suggests itself how easily a substitute for it could be improvised. It is the old, old story of the egg of Columbus. The idea, once suggested, by its very simplicity assumes its place in the mind as a familiar one. Simple as it is, it affords the means of using a most important therapeutic resource, and, in my estimation, leaves nothing to be desired in this respect. Recognizing in this a method by which cold could be applied to the surface for any length of time without fatigue or exhaustion to the pa-

tient and without the danger of excessive chilling, since any great depression of temperature can be obviated by the affusion of warm water, I determined at once to adopt it after ovariotomy.

In adopting this plan of treatment after ovariotomy, and as I have in several cases done after parturition, I did not propose by it to check peritonitis, or to cut short septicæmia, the great evils to be feared at this time. My hope was to rob these diseases of one of their chief weapons of destruction—hyperpyrexia, and thus to resist the primary assault in the hope of bearing up against a more prolonged though less violent siege.

In all acute and grave diseases, the invasion of the disorder produces great commotion, which rapidly subsides as the system becomes familiarized with the invading ailment. This is most marked in pneumonia—and to a less degree in peritonitis and septicæmia, if the patient does not succumb very early. How often has every ovariotomist been surprised, in making an autopsy of a patient who has apparently died of acute peritonitis, to find only a slight field of pelvic peritonitis, which most unsatisfactorily accounts for the destruction of life!

Robbed of its lengthy and wearing high temperature, which lasts for weeks, depraving the blood, altering the nerve-centres, and degenerating the muscles, typhoid fever runs a much more manageable and less violent course. So septicæmia and peritonitis, kept from the commencement of their courses within normal limits as to temperature, are wonderfully different in their manifestations from the same diseases uninterfered with in this respect. Under these circumstances the system of the patient may be likened to a city exposed to attack from an armed foe. By assault it would stand little chance; but, once having resisted this, its prospects of holding out against a siege would be good, although in the end it might yield even to this. Still the prospects of successful defense would be greatly increased if the primary, most energetic, and most vigorous attack were defeated.

For most of the notes of the cases which I shall now present to illustrate these remarks, I am indebted to Drs. John Van Vorst and James L. Perry, House Surgeons of the Wo-

man's Hospital. I shall be forced to be rather prolix with reference to the daily thermometric record, but I shall endeavor to be as little so as is compatible with a clear demonstration of the influence of cold to the surface upon increased animal heat.

CASE I.—Mrs. S., aged twenty-two years, married six months, native of Maryland, was admitted to the Woman's Hospital on account of a very large ovarian tumor which had been discovered nine months before. She was extremely exhausted, and the prognosis which was made as to her recovery from operation was very unfavorable. The removal of the tumor was rendered exceedingly difficult by numerous and firm adhesions, and in twenty-four hours acute peritonitis developed itself unmistakably.

The operation being completed at 3 p. m., the patient did quite well until 8.45 on the next day, when the temperature rose to 102° , the pulse to 120. By 2 p. m. the former had risen to $102\frac{2}{5}^{\circ}$, and at 3.30 p. m. it had reached 103° , the pulse 130, and there were intense abdominal pain and frequent vomiting. At 3.50 the patient was arranged upon Kibbee's fever-cot, and half an hour later was showered with water at 50° Fahr. The temperature rapidly fell to $101\frac{2}{5}^{\circ}$. Affusion repeated in forty minutes; and in an hour from this time the pulse had fallen to 112 and the temperature to $99\frac{2}{5}^{\circ}$. Pain had been quieted by morphia hypodermically administered; and, although exquisite tenderness to touch existed over the abdomen, the patient was very comfortable; this was at 6 p. m. The temperature did not again rise above 100° that day, although the intense pain, which required large amounts of morphia hypodermically, evidenced the fact that acute peritonitis was steadily progressing. The patient was of course kept constantly enveloped by the wet sheet. At 2.15 p. m. the next day, temperature $100\frac{3}{5}^{\circ}$; and at 3.45, 101° . Cold affusion again practised, water at 88° . At 4.30, temperature was $100\frac{4}{5}^{\circ}$. Cold affusion again practised, and at 6 p. m. pulse had fallen from 120 to 110, and temperature to 99° . Patient nourished by rectum almost entirely, and pain controlled by morphia administered hypodermically. Temperature did not again reach 100° before 4.30 a. m. the next

day, when it reached $100\frac{2}{5}^{\circ}$. At 7.30 it had reached $100\frac{4}{5}^{\circ}$, when cold affusion was practised at 63° . At 10. A. M. temperature had fallen to $99\frac{4}{5}^{\circ}$. It did not again reach 100° until 6 A. M. on the next day, when pulse was 120, temperature 101° . Affusion practised at 58° . At 7.30 A. M. pulse had fallen to 116, and temperature to 99° . Temperature did not again reach 100° on that day. On the following day, at 1.30 P. M., it went up to $101\frac{1}{2}$, and pulse to 140, when affusion was practised at 84° . At 4. P. M., temperature having fallen only one degree, affusion was repeated, and at 9 P. M. pulse was 135 and temperature 98° . Temperature did not rise above 100° on the next day; and, although the patient was kept constantly enveloped by the wet sheet, affusion was not repeated until 2.30 P. M. on the day following, when temperature was $100\frac{4}{5}^{\circ}$. It immediately fell so that in a half hour it was $99\frac{1}{2}^{\circ}$. Affusion was not repeated till 6.15 P. M. the next day, when, temperature rising to $100\frac{1}{5}^{\circ}$, it was practised at 78° , and at 7.30 P. M. it had fallen to $99\frac{2}{5}^{\circ}$.

In this way the temperature was kept at or below 100° for twelve days, the patient meantime being sustained by rectal alimentation, and pain subdued by morphia, given hypodermically. All through the progress of the case, I and the gentlemen associated with me in its treatment had been convinced that acute peritonitis, which under ordinary management would have destroyed our patient's life within two or three days, was steadily progressing with a temperature nearly normal and comparative freedom from pain. This opinion was corroborated by a discharge of over a pint of pus through the abdominal incision on the fourteenth day. After this the temperature again rose, but was readily controlled by cold affusion. The patient's condition evidencing great prostration, on five occasions intra-venous injection of milk was practised, as has been on a previous occasion related to this society; but, in spite of all our efforts, she died on the twenty-sixth day after operation. Autopsy revealed evidences of an intense peritonitis, with several points of localized gangrene of the intestine, which had produced death.

CASE II.—Mrs. B., aged thirty-nine, born in America; married, but never pregnant; was submitted to the operation

of ovariotomy, which was postponed on account of bronchitis, accompanied by considerable dyspnoea. Tumor very large, firmly adherent, and removed with difficulty. Operation performed at 3 p. m.; in twelve hours temperature began to rise, and soon reached 104°; patient complaining of a good deal of abdominal pain. Being placed upon the fever-cot, affusion was practised every hour or two hours for from ten to fifteen minutes at a time, with water varying from 68° to 75°. Temperature fell gradually, diminishing about half a degree after each affusion, until five had been practised, when, at 3 p. m. the next day, twenty-four hours after operation, it was 101°; pulse 106. Pulse had been previously 135. On the second, third, fourth, and fifth days, temperature was kept by repeated affusion at about 101°, sometimes being as low as 100°, sometimes as high as 101½. On the fifth day a severe attack of acute pleuritis developed itself, which soon became complicated by copious effusion. Temperature rose to 102½° at this time, but the affusions being kept up it was readily controlled and kept at about 100°. On the eighth day after operation the patient seemed to have entirely recovered from the effects of ovariotomy, and she was removed from the pavilion in which it had been practised to the main building of the hospital; but at the end of two weeks great aggravation of the pulmonary symptoms developed itself with symptoms of pneumo-thorax, to which the patient succumbed.

Autopsy revealed evidences of peritonitis, pleurisy with effusion, and pneumo-thorax.

It is an open question whether the application of cold may have created the pulmonary complication which caused the fatal issue in this case. From my experience with the plan, I am impressed with the belief that it did not, but of this I of course am not positive.

I have had two other cases, treated in this way after ovariotomy, terminate fatally, but I shall not weary the society with their relation, as they but repeat the lessons taught by the two just recited—namely, the uniform capacity of this method of refrigeration for maintaining a nearly normal temperature, even while a fatal disorder, one of the most striking

characteristics of which is hyperpyrexia, still steadily marches on to a fatal issue.

CASE III.—Mrs. K., aged forty-six, a native of France; married ten years, mother of one child; was operated upon by ovariotomy at the Woman's Hospital under Lister's method. Operation was performed at 3 p. m. At 9 a. m. the next day the patient was taken with violent pain in the abdomen, and the temperature began steadily to rise, and at 3 p. m. on the next day it had reached 104°. At this time I saw her, and had no doubt but that acute peritonitis was certainly developing. Patient had been removed from the operating-table directly to the fever-cot, and cold affusion was promptly adopted. Practised with water at from 70° to 75°, and repeated nearly every hour, the first three applications produced but little effect; but at 7 a. m. the next day, ten affusions having been given, the pulse was 98 and the temperature 100°. At 11 a. m. pulse was 102 and temperature 98 $\frac{3}{4}$ °. After this no difficulty was experienced in keeping the temperature at or a little below 100° by rare affusions, the patient, of course, being constantly enveloped in the wet sheet, until the seventh day, after which she was removed to her bed, and steadily progressed to recovery.

CASE IV.—Mrs. S., aged fifty, native of Ireland; married twenty-eight years; mother of four children; was submitted to ovariotomy for the removal of a very large tumor at 9.30 a. m. On the third day the temperature and pulse began to rise, patient to complain of great abdominal pain and tenderness, and to suffer from tympanites. By the latter part of the day pulse ranged at 112, and temperature at 102 $\frac{2}{3}$ °, when the patient was put upon the fever-cot and affusion practised at 74°. By 8.30 a. m. the next day, only three affusions having been practised, pulse was 96, temperature 100 $\frac{2}{3}$ °. They remained about this until 6 p. m., when temperature went up to 102 $\frac{1}{10}$ °, when affusion was practised at 72°. It came down by 10 p. m. to 101°, and after three more affusions to 99° at 2 a. m. the next day. After this temperature remained about 101° until the eleventh day; but, as there seemed to be no tendency to increase, no affusion was practised, patient being merely kept in the wet sheet. Then she was re-

moved from the pavilion to the hospital, where she steadily convalesced.

CASE V.—Mrs. S., a multipara, was submitted to ovariotomy for the removal of an ovarian cyst which had ruptured and discharged its contents into the peritoneal cavity. For three days convalescence progressed favorably, but at this time alarming symptoms developed themselves. The temperature, which had previously been 101°, rose to 102°, 103°, 104°, and toward mid-day on the third day had reached 105 $\frac{1}{5}$ °. The pulse at the time ranged between 130 and 140. The patient was at this time put upon the fever-cot by Drs. Walker and Jones, who had charge of her during my temporary absence from town, and affusion was practised at 80°. The result was immediate and gratifying. In an hour and a quarter temperature had fallen to 102 $\frac{1}{2}$ ° and pulse to 118, and in twelve hours more, four affusions having been practised, temperature was 100 $\frac{6}{10}$ ° and pulse 104. The patient was kept constantly enveloped in the wet sheet, and by using the cold affusion at irregular intervals, when temperature would reach 102°, it was maintained nearly at the normal standard for a week, after which time the patient advanced to complete recovery.

CASE VI.—I shall here introduce, by way of increasing the interest in this subject, a case of peritonitis, which arose from other causes than those developing after ovariotomy. Mrs. S., a multipara, who had for a number of years suffered from retroflexion of the uterus, was wearing a pessary, which she had been directed to remove in case of any pain developing in the pelvis which could at all be attributed to its presence. In spite, however, of considerable discomfort, she neglected to do this, and one night near 2 A. M. she was suddenly seized with violent pain in the hypogastrium, for which she sent for a neighboring physician, who administered morphia freely for its relief. On the next day I saw her, and found the pulse beating at 120 to the minute, and the temperature elevated to 102°. She was put at once upon fluid diet, all pain was quieted by opium, a nurse was procured, and the strictest quiet enjoined; but the disease was not controlled, and on the third day of the attack the pain was so

violent as to require large doses of morphia for its control ; the pulse beat at 140 and the temperature rose to $104\frac{1}{2}^{\circ}$. Dr. Walker, who saw her at the time, reported to me that a fatal issue was almost certain.

I determined to try the use of affusion by the method of Kibbee, and the result was better than I had anticipated it could be. Affusions at from 60° to 70° were practised for a week, with the almost constant result of lowering the temperature quickly and certainly.

One fact which was very strikingly noticeable in this case was the much more decided and beneficial effect of opium given when the temperature was near the normal standard, than when given, the animal heat being much exalted. That the opium treatment alone would not have effected a cure in this case, and that the recovery of the patient was due to systematic maintenance of the temperature at a point near the normal standard, I feel as sure as I can feel about anything which I cannot demonstrate.

In four cases I have employed this method, not as a curative one for the sequelæ of ovariotomy, but as a preventive measure. The patient has been at once removed from the operating table to Kibbee's fever-cot, and, so soon as the temperature has risen to or above 101° , cold affusions have been practised, not with the view of curing a commencing attack of peritonitis, but of preventing its development. All these cases have recovered. As an example of the action of the plan I shall relate only one, for the others resemble it so closely that a detailed reference to them would be tedious and unnecessary :

CASE VII.—I was requested by Dr. W. S. Ayer, of Owego, to go to that place and remove a large abdominal tumor from a patient whose history was the following. Having suffered for between two and three years from great abdominal enlargement, and the existence of a tumor having been recognized, Mrs. B. had, through Dr. Ayer's advice, consulted one of the most eminent ovariotomists of this country. He had pronounced the tumor to be a uterine fibroid, and this had induced the patient to avoid operation. As, however, a fatal termination was now imminent, and as Dr. Ayer felt doubt-

ful as to the correctness of this diagnosis, he requested me to go to Owego prepared to remove the tumor, whatever its nature might be. I went prepared to remove the entire uterus, but upon examination of the case became at once convinced that the tumor was ovarian, with a large proportion of solid material in its structure. The removal of the growth was difficult on account of its great size, but it was successfully accomplished, the patient being at once placed upon a fever-cot and left under the care of Dr. Ayer. I now read his report of the case, which went on steadily to complete recovery.

"Ovariotomy was performed on Mrs. B., May 4th, at 12.30 p. m. Two weeks preceding the operation, she had an attack of subacute peritonitis, resulting in large effusion into the peritoneal cavity and an extremely irritable stomach. At the time of the operation she was very feeble, her pulse being 120 and temperature 99°.

"Immediately after operation pulse 140, temperature 98°.

"At 9 p. m. temperature 99°, pulse 130.

"*May 5th.*—11 a. m., temp. 102°; pulse 130; cold used. 2 p. m., temp. 98°; pulse 100. 10 p. m., temp. 98°; pulse 110.
 "6th.—5 p. m., temp. 100°; pulse 120.
 "7th.—9 p. m., temp. 102°; pulse 130; cold used.
 "8th.—9 a. m., temp. 100°; pulse 120. 9 p. m., temp. 101°; pulse 130; cold used.

"9th.—9 a. m., temp. 99½; pulse 112. 9 p. m., temp. 100½°; pulse 112.

"10th.—9 a. m., temp. 102°; pulse 120; cold used. 9 p. m., 100¾; pulse 115.

"11th.—9 a. m., temp. 100°; pulse 115. 6 p. m., temp. 102½°; pulse 115; cold used. 9 p. m., 101°; pulse 110.

"12th.—9 a. m., temp. 99°; pulse 108.
 "14th.—7 p. m., temp. 104°; pulse 140; water used freely. 9 p. m., temp. 102°; pulse 130; water used freely.

"15th.—6 a. m., temp. 101°; pulse 130; cold used. 6 p. m., temp. 100°; pulse 120.

"After the eleventh day the temperature did not go above 100° and convalescence was thoroughly established. The cold affusion was most grateful to her, she often begging to have it

used, although she was left in the wet sheets. I am unable to account for the sudden rise of temperature on the eleventh day. It caused me much anxiety, but was readily controlled by the affusion. For four days succeeding the operation the patient was nourished entirely by enemata, with frequent hypodermics of brandy.

"The wound including the fistula was closed by the thirtieth day, and the patient sitting up and dressed. The direction not to allow the temperature to go above 101° without using the affusion was carried out to the letter, and seems to me was the cause of saving the patient's life."

CASE VIII.—In only one case have I seen cold affusion depress the patient's system to a degree to cause any anxiety. In this case, a young girl of sixteen years for whom I had removed a tumor of medium size, the heart's action appeared to be unfavorably affected. The pulse under the influence of the affusions would become irregular and intermittent, and the hands very cold and a little blue. As, however, the temperature rose to $103\frac{1}{2}$ ° on the third day after operation, the plan was cautiously persisted in. The cold affusions controlled the rise of animal heat very perfectly and the patient made a rapid recovery.

In reviewing the notes of this case, I am satisfied that the unfavorable developments were due to one or both these causes: the patient was saturated with malaria, and the early affusions practised were at too low a temperature. In a sensitive patient it is well to begin with water at 98°, and, using it once an hour, to diminish gradually, carrying the temperature of the fluid down to 95°, then to 90°, 85°, 80°, 75°, 70°, and lower when necessary.

In concluding this paper, I must say that no one recognizes its incompleteness more thoroughly than I do. Only one point is fully proved by it—that is, the efficacy of cold affusion in controlling the high temperature developing after ovariotomy. In extenuation of this circumstance, I offer the fact that this is the only position which it assumes, and the only one which it is called upon to sustain. That by it peritonitis or septicæmia is absolutely checked, I do not claim. That their courses are by it robbed of much of their destructive tenden-

ey, I trust that I have demonstrated, as far as demonstration is possible from so small an exhibit of cases. A mere personal conviction unsupported by clinical demonstration is, and should ever be, a matter of little moment in a scientific discussion. In the face of this assertion, however, I venture to record mine to the effect that the practice of cold affusion, by Kibbee's method, for the control of high temperature, is sure in the future to earn for itself a position of honor and trust from ovariotomists.

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